

## **ABSTRACT**

Increases in the AP1 and AP2 thickness cause the free layer to be off-center in a CPP magnetic read head. This problem has been overcome by inserting supplementary magnetic shields within the spin valve, located as close as possible to the stack. These supplementary shields enable the read gap width to be reduced by about 430 Å and the free layer to shift back towards the center by about 30 Å.